Field Guide to the Amphibians of Western India

PART 2

BY

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(*With two plates and four text-figures*)

[*Continued from Vol.* **60** (2) : 438]

Family MICROHYLIDAE: Narrow-mouthed Frogs

These frogs are easily distinguished by the smallness of the head in relation to the body. They are not uncommon but, being fossorial forms, are rarely seen except during the breeding season. Many species live more or less exclusively on ants and termites and are often seen in association with termite colonies. The family is widely distributed and occurs in the tropics of both hemispheres.

The narrow-mouthed frogs differ from the frogs (Ranidae) and tree frogs (Rhacophoridae) by the absence of teeth in the upper jaw and the entire nature of the tongue, and are distinguished from the toads (Bufonidae) by the circular or oval tongue, the circular or vertical pupil, and the smooth skin of the body. Within the family, two characters are of importance in separating the genera, the presence or absence of ridges on the palate in front of the pharynx and the presence or absence of disc-like dilatations on the finger tips. In all Indian microhylids, the tympanum is hidden or absent and the first finger is shorter than the second. The tadpoles lack teeth rows on the lips. Five genera with nine species occur in India.

KEY TO THE GENERA OF MICROHYLIDAE

1.	Tips of fingers not dilated	.. 2
	Tips of fingers dilated into discs	.. 4
2.	Palate without ridges	.. *Melanobatrachus*
	Palate with ridges	.. 3

3. No papillae behind internal nares. Size small, when adult less than 35 mm. from snout to vent .. *Microhyla*

   Papillae present below internal nares. Size large, when adult over 40 mm. from snout to vent .. *Uperodon*

4. A bony ridge immediately below internal nares .. *Kaloula*

   A fleshy ridge some way below internal nares .. *Ramanella*

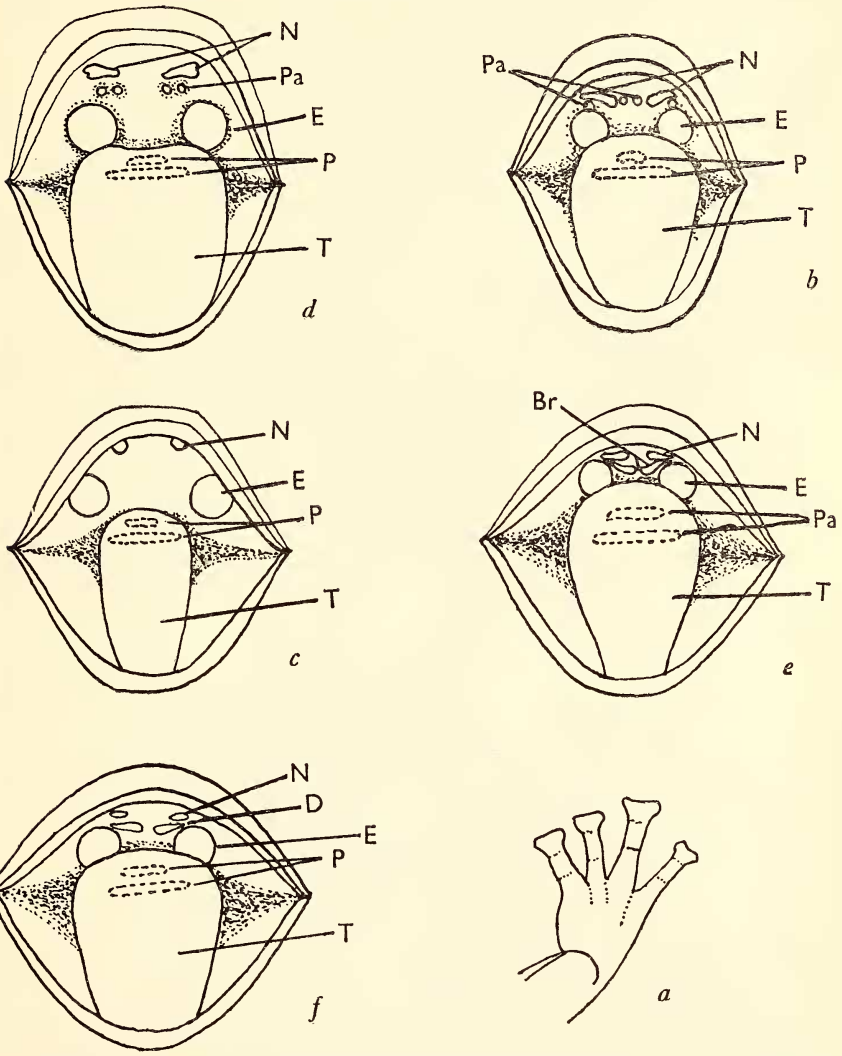

Fig. 15. *a.* Hand of *Ramanella montana*; Mouth of : *b. Uperodon systoma* ; *c. Microhyla ornata* ; *d. Uperodon globulosum* ; *e. Kaloula pulchra taprobanica* ; *f. Ramanella montana.*

N : internal nares ; Pa : papilla ; E : inner bulge of eye ; P : dotted lines on tongue indicating position of palatal ridges ; T : tongue ; Br. Bony ridge ; D. dermal ridge

Genus **Melanobatrachus** Beddome 1878

Restricted to south-west India. One species.

Melanobatrachus indicus Beddome 1878 : Black Microhylid

Diagnosis[1]. Distinguished from other species of the family by the absence of palatal ridges. Size small, 34 mm. in snout-to-vent length. Interorbital width broader than upper eyelid; pupil circular; tongue oval entire; toes webbed at base; sub-articular tubercles and inner metatarsal tubercle indistinct; tibio-tarsal articulation reaches to midway between shoulder and eye. Skin pustular above, smooth below.

Colour. Black. Thigh with a continuous or interrupted quarter-inch-broad scarlet band near groin. A few scarlet blotches on chest, between forelegs, and on lower portions of hindlegs sometimes present.

Distribution. A rare species. Collected only from the Anamalais and other hill ranges in Kerala.

Habits. Beddome (1878) remarks that he collected the frogs in moist evergreen forest at an elevation of 4000 ft. (*c.* 1219 m.), torpidly curled up almost into a ball under old rotten logs.

Breeding habits and larvae unknown.

Genus **Microhyla** Tschudi 1838

The genus is widely distributed in south-east Asia and from Brazil to the southern United States of America. Two species occur in India.

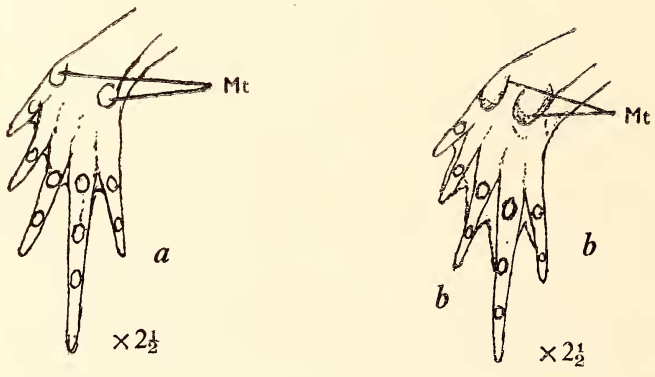

Fig. 16. Hindfoot of : *a. Microhyla ornata* ; *b. Microhyla rubra* (both ventral views)

Mt : metatarsal tubercle

[1] Based on Beddome, Lt.-Col. R. H. (1878) : Description of a new Batrachian from South India belonging to the family Phryniscidae. *Proc. Zool. Soc. London* : 722-3.

KEY TO THE SPECIES OF *MICROHYLA* TSCHUDI 1838

Habit slender, two normal metatarsal tubercles	..	*ornata*
Habit stout, two shovel-shaped metatarsal tubercles	..	*rubra*

Microhyla ornata (Dum. & Bibr.) 1841 : Ornate Microhylid

(Text-fig. 15*c*, 16*a*, 17)

Diagnosis. A small slender microhylid rarely exceeding 25 mm. in snout-to-vent length. The colour pattern of the back is distinctive. Interorbital width nearly twice as broad as upper eyelid. Toes with a rudiment of web. Two prominent metatarsal tubercles. Tibio-tarsal articulation reaches to the shoulder or to slightly beyond the anterior border of eye. The heels meet when the legs are held at right angles to the body. Skin smooth or slightly tubercular.

Colour. The characteristic pattern on the back, which may be bright pink or brown of varying shades, begins between the eyes where it extends to both eyelids, narrows on the nape, widens above the shoulder, narrows again, and finally broadens out sending a stripe to the groin and the thigh. A dark streak from behind the eye to the shoulder, limbs crossbarred. White below, throat and chest may be stippled with brown. Throat in breeding male black.

Distribution. India, Ceylon, south-east Asia, south China, and Formosa.

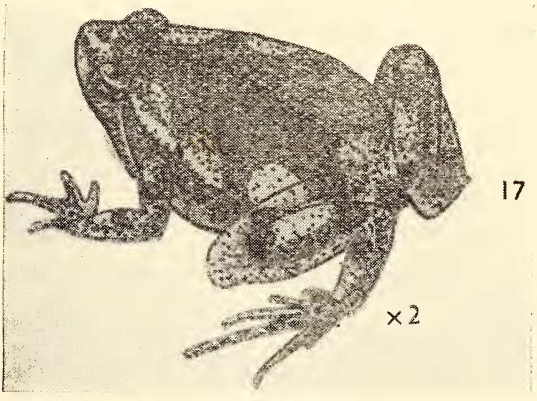

Fig. 17. *Microhyla ornata* × 2

Breeding. The breeding season commences once the monsoon rains have well set in and occurs throughout the monsoon period in south-western India. The period varies with the rainy season in different

areas of its distributional range. Flower (1899)[1] records tadpoles between December and February in Malaya. The male can be heard calling at night near temporary rainwater pools and similar situations. Several males may call from the same area but, though the call is startlingly loud for an animal of its size, it is ventriloquistic and makes location of the small frog sitting in the midst of grass or among stones extremely difficult. In this, as in some other species of *Microhyla*, I believe the male remains stationary and is located by the female by its call. McCann (1940)[2] records the number of eggs in a female collected in September as approximately 200. Earlier (1932)[3] he opines that eggs are laid singly in separate mucilaginous envelopes. However, Ferguson (1904)[4] states that the eggs which measure 2 mm. in diameter are laid in flat transparent masses. I have, unfortunately, no personal record. The tadpoles are transparent and have a diamond-shaped mark of almost gold colour on the head. The head and body are massive and the tail which is half as long as the head and body ends in a short terminal flagellum. They move in shoals just below the surface of the water or at the surface. According to C. R. Narayan Rao (1917)[5] the large air spaces which occur in the gill chambers provide the necessary buoyancy and the offensive secretion of two cephalic glands makes them unpalatable to fishes and other aquatic life thus offering them protection in spite of the exposed nature of their movements. The tadpoles are microphagus. Parker (1928)[6] suggests that the flagellated tail helps the tadpole to maintain a stationary position while feeding by counteracting the forward thrust of the water taken in through the mouth and filtered out by the gills through the spiraculum. When feeding the tail is bent back almost parallel to the body and the flagellum at the tail tip vibrated rapidly. Unlike in the adult the toes when they appear are completely webbed. Development is rapid and the young measure *c.* 9 mm. at metamorphosis.

Habits. This pretty little microhylid is the commonest species of the family and one of the smallest of Indian amphibians. It has adapted itself to life in different biotopes, and occurs in desert areas

[1] Flower, S. S. (1899) : Notes on a second collection of Batrachians made in the Malay Peninsula and Siam, from November 1896 to September 1898, with a list of species recorded from those countries. *Proc. Zool. Soc. London* : 885-966.

[2] McCann, C. (1940) : A Reptile and Amphibian Miscellany. *J. Bombay nat. Hist. Soc.* **42** (1) : 45-64.

[3] ——— (1932) : Notes on Indian Batrachians. ibid. **36** (1) : 152-180.

[4] Ferguson, H. S. (1904) : A list of Travancore Batrachians. ibid. **15** (3) : 499-509.

[5] Rao, C. R. N. (1917) : On the occurrence of iridocytes in the larva of *Microhyla ornata* Boul. *Rec. Indian Mus.* **13** : 281-92.

[6] Parker, H. W. (1928) : The Brevicipitid frogs of the genus *Microhyla*. *Ann. Mag. Nat. Hist.* **2**, 10th series, 473-99.

like Cutch and areas of heavy rainfall as Kerala and Assam. It is found in the plains and to about 5000 ft. (1524 m.) in the hills. While it aestivates when conditions are unsuitable, it may be found throughout the year in suitable areas with cover and moisture. The juvenile frogs may be seen for a short period in the dried-up but still moist beds of temporary rainwater pools well after the monsoon season. The dispersal of young which occurs among toads from the breeding area apparently does not happen to a similar extent in this species. Unlike many microhylids this frog is quite agile and difficult to capture. It feeds mainly on ants and other small-sized insects.

Microhyla rubra (Jerdon) 1854: Red Microhylid

(Text-fig. 16*b*, 18)

Diagnosis. A stout small frog distinguished from *Microhyla ornata* by its well-developed shovel-shaped metatarsal tubercles and more webbed toes, the web reaching the last row of tubercles in the male and midway between the first and second row of tubercles in the female. Sub-articular tubercles prominent. Tibio-tarsal articulation reaches to between the shoulder and the eye. Skin smooth or slightly warty above; a fold from eye to shoulder. Smooth below except anal region which is granular. Heels may or may not meet when the legs are held at right angles to the body.

Fig. 18. *Microhyla rubra* × 2

Colour. Head and back red bounded by two dark bands along flanks from tip of snout to groin. Back with or without traces of dark

pattern, usually broken-up. Limbs indistinctly crossbarred; white below, throat and chest light brown. Male with subgular vocal sac which area is black in the breeding season.

Distribution. South India, Ceylon, Assam. Not recorded north of Malabar in western India and Bangalore in the Peninsula. This species is likely to be more widespread than the collection records indicate.

Breeding. The breeding season coincides with the monsoon and in areas which receive both the south-west and the north-east monsoons tadpoles may be seen from June to November. The eggs are laid in flat transparent masses as in *M. ornata* but are of large size, 5 mm. in diameter (Ferguson op. cit.). Tadpoles similar to those of *M. ornata* but have a longer tail, over twice the length of head and body. Transparent with reddish pink tint according to Ferguson (op. cit.) but noted as olive above beautifully marbled by C. R. N. Rao (1915)[1]. Parker (op. cit.) suggests that the difference in colour may be due to local variation. The spawn is laid in rainwater pools. Tadpoles similar in habit to *M. ornata* tadpoles. Development is rapid.

Habits. A fossorial species unlikely to be seen except during the breeding season. The specimens collected by me were from sandy river beds and according to Ferguson (op. cit.) the species is fairly common in the low country of Kerala. C. R. N. Rao (op. cit.) states that the call is akin to the chirping of crickets but can be distinguished from a cricket's as it is interrupted and not continuous.

Genus **Uperodon** Dum. & Bibr. 1841 : Balloon Frogs

The rotund shape of the species of this genus makes them distinctive. The mouth has a short ridge ending in one or two papillae behind or between the internal nares. The genus is restricted to India. Two species are known.

Key to Species of the Genus *UPERODON*

A pair of 'papillae' together below internal nares. Interorbital width nearly thrice upper eyelid. Colour uniform brown or grey (Text-fig. 15*d*). ..	*globulosum*
A pair of 'papillae' between the internal nares and a papilla below each internal nare. Interorbital width about twice upper eyelid. Back marbled (Text-fig. 15*b*). .	*systoma*

[1] Rao, C. R. N. (1915): Some south Indian Batrachia. *Rec. Indian Mus.* **11** : 31-8.

Uperodon globulosum (Günther) 1864 : Balloon Frog

(Plate III, Text-fig. 15*d*)

Diagnosis. Head small with rounded snout and beady eyes; interorbital width $2\frac{1}{2}$ to 3 times the breadth of the upper eyelid. Hindlegs short with two large shovel-shaped metatarsal tubercles. Toes with a rudiment of web, tibio-tarsal articulation does not reach the shoulder.

Skin smooth above and smooth or wrinkled below. Anal region granular. An occipital fold and an indistinct fold from eye to shoulder, uniform brown or grey above, white below with tinges of yellow during the breeding season. Throat black in the breeding male.

Distribution. Bengal (Calcutta, Jalpaiguri), Orissa (Russelkonda), Madhya Pradesh (Berar), Gujarat (Surat Dangs)[1], Maharashtra (Bombay), Mysore (Khanapur).

Breeding. The breeding season coincides with the onset of the monsoon in western India. This species was first recorded breeding in cisterns in rock near Kanheri caves, Salsette Island, Bombay; however, later observations have shown that the species breeds in any standing water, even temporary rainwater pools which may dry up in a few days. The call is a loud grunting *oink* and helps the female to locate the male. Tadpoles are active swimmers. In colour they are olive-brown above with a whitish tail which is striped longitudinally with dark blotchy lines. Flanks and below spotted with dark. The tadpoles are microphagus.

Habits. This species was considered to be rare but recently Abdulali (1962)[2] found them at Khanapur, in Mysore, in large numbers in the month of May. The species has, perhaps, a wider distribution than what the collection records indicate, but as a completely fossorial species it is not seen above ground except during the breeding season. Apart from collections made at breeding spots the species has been seen mainly in termite nests, and it would appear that this sedentary species restricts its movements to finding and burrowing into the nests of their main food, termites and, perhaps, ground-dwelling ants. They are excellent burrowers and in loose soil using their powerful metatarsal tubercles quickly burrow and disappear underground. While burrowing the soil is dislodged by sideways movements of the legs and the animal literally subsides into the ground; the eyes disappear last, leaving no trace above of its presence inside. In clayey

[1] *infra* page 742.

[2] Abdulali, Humayun (1962) : An account of a trip to the Barapede Cave, Talewadi, Belgaum District, Mysore State, with some notes on Reptiles and Amphibians. *J. Bombay nat. Hist. Soc.* **59** (1) : 228-37.

soil, however, an opening to the outside may be seen. Dampness of the soil is essential for their well-being and they live at considerable depths in the dry months—one specimen has been collected at a depth of eight feet and lived for about 13 months without food, showing no effects of starvation during the first nine months (D. D. Mukerji, 1931)[1]. The globular shape is partly due to the enormously distensible lungs which when inflated rise above the level of the backbone. The skin exudes a sticky secretion when the animal is kept above the soil. On land they move with short hops or slow walk. In water they float and are at the most feeble swimmers.

Uperodon systoma (Schneider) 1799 : Marbled Balloon Frog

(Plate III, Text-fig. 15*b*)

Diagnosis. Distinguished from *U. globulosum* by its coloration, its smaller size, and the interorbital width being narrower—$1\frac{3}{4}$ to twice the width of the upper eyelid, and the papillae in the mouth consisting of a pair between the internal nares and one below each nare.

Colour. Olive to fawn or pinkish above, marbled or spotted with dark brown. Below white, throat often mottled with brown. Breeding male has the vocal sac area black and lower lip tinged with yellow.

Distribution. Agra, Allahabad in the Gangetic plain, south India (common at Madras). In western India only recorded in south Kerala. The species may prove to be more widespread than recorded.

Breeding. Ferguson (op. cit.) recorded it as breeding in Trivandrum in June and July. Like other species of Indian Amphibia breeding coincides with the rainy season and would vary with the advent of the rainy season in different areas of its distribution. The call has been compared to the bleating of a goat (C. R. N. Rao, 1918)[2]. The vocal sac distends enormously and looks more like a float than a resonator while the animal is calling from water. The eggs are laid in masses. The tadpole is indistinguishable from that of *U. globulosum.*

Habits. Similar to *U. globulosum.*

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[1] Mukerji, D. D. (1931) : Some observations on the burrowing toad *Cacopus globulosum* Günth. *J. Proc. Asiatic Soc. Bengal*, N.S., **27** : 97-100.

[2] Rao, C. R. N. (1918) : Notes on the tadpoles of Indian Engystomatidae. *Rec. Indian Mus.* **15** : 41-5.

Balloon Frog, *Uperodon globulosum*

(*Photo : J. C. Daniel*)

Marbled Balloon Frog, *Uperodon systoma*

(*Photo : S. R. Sane*)

Ceylon Kaloula, *Kaloula pulchra taprobanica*

(*Photo : J. C. Daniel*)

Jerdon's Ramanella, *Ramanella montana*

(*Photo : S. R. Sane*)

Genus **Kaloula** Gray 1831

(Text-fig. 15*e*)

Diagnosis. A strong bony ridge behind opening of internal nares; tip of fingers dilated into discs, toes webbed. A single species in India.

Kaloula pulchra taprobanica Parker 1934 : Ceylon Kaloula

(Plate IV, Text-fig. 15*e*)

Diagnosis. A medium-sized stout microhylid immediately distinguished from all other Indian frogs and toads except *Ramanella* by having only the finger tips dilated into discs. Distinguished from *Ramanella* by the presence of bony ridges immediately below choanae.

Head short, rounded, with indistinct canthus rostralis; interorbital space broader than upper eyelid; fingers with well-developed truncate discs which are twice as wide as the last phalange; toes about $\frac{1}{3}$-webbed; two strong compressed metatarsal tubercles; tibio-tarsal articulation reaches to the shoulder.

Colour pattern is distinctive and consists of blackish brown and bright red areas. A wide median blackish brown area bordered by two dorso-lateral bands of red and narrow interorbital band of red. In addition there are spots and patches of red within the black pattern. Light grey below, spotted or marbled with brown. Chin and throat black in breeding male.

Distribution. South India (Cauvery River), Calcutta, Ceylon; in western India collected at Khanapur, North Kanara.

Habits. Very little information is available on the habits of this microhylid. Breeding habits unknown but they have been observed in copula in temporary rainwater pools in May at Dandeli by Abdulali (op. cit.), who records the call as shriller than that of the smaller *Ramanella montana*. The nominate race *Kaloula pulchra pulchra* Gray is widely distributed in south-east Asia.

Genus **Ramanella** C. R. N. Rao & B. S. Ramanna 1925

The genus is found only in peninsular India and Ceylon. Three species occur in India.

Key to the Species of the Genus *RAMANELLA*

1.	Belly immaculate white ..	*variegata*
	Belly brown or black spotted or marbled with white ..	2
2.	Toes free ..	*triangularis*
	Toes webbed ..	*montana*

Ramanella variegata (Stoliczka) 1872 : Variable Ramanella

(Text-fig. 19)

Diagnosis. A small microhylid, less than 40 mm. in snout-to-vent length. Post-narial ridges sometimes pigmented; finger discs triangular

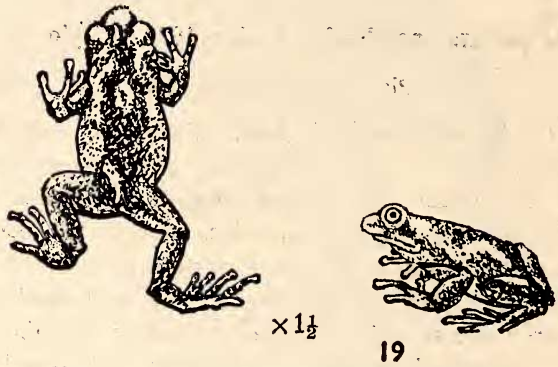

Fig. 19. *Ramanella variegata* nat. size.
(After Günther 1875)

nearly twice the width of penultimate joint; toes with rudimentary web; two metatarsal tubercles; tibio-tarsal articulation reaches shoulder. Skin smooth.

Colour. Brown with lighter marblings or spots, no stable pattern. White below, chin and throat may be brown stippled.

Distribution. Mainly recorded from eastern peninsular India, up to Chanda in Madhya Pradesh.

Breeding. Very little information is available on the breeding habits. C. R. Narayan Rao (1918, op. cit.) syllabilises the call as *ghauy, ghauy* usually heard after heavy rainfall. The tadpoles are brown or grey with minute black spots and occasionally a blue spot on each side of the body. They are bottom dwellers and development is rapid being completed within a month.

Habits. On its habits Narayan Rao & Ramanna (1925)[1] state that it is most often found in termitaries or under stones in association with large black scorpions *Heterometrus* sp. When disturbed they briskly crawled over the scorpions but when the scorpions went over them in turn flattened out and froze. In soft soil they burrow well but usually remain with the nose above ground probably related to their habit of living under stones which makes deep burrows unnecessary. They

[1] Rao, C. R. N. & Ramanna, B. S. (1925) : On a new genus of the Family Engystomatidae (Batrachia). *Proc. Zool. Soc. London* : 587-97.